Draft (RFP 2530) March 1998

American Water Works Association
RESEARCH FOUNDATION®

DRAFT REQUEST FOR PROPOSALS

Application of Bioreactor Systems to Low-Concentration Perchlorate-Contaminated Water (RFP 2530)

Objective

1. Evaluate the efficiency of a biological process to reduce perchlorate concentrations of up to 1,000 micrograms per liter to drinking water action levels of 4-18 micrograms per liter,
2. Evaluate the impact of co-contaminants, such as nitrate and volatile organic compounds (VOCs), on process performance, and
3. Characterize process effluents and define post treatment requirements.

Background

A limited number of bioreactor systems have been successfully developed to treat water streams with high concentrations of perchlorate. Examples are the Aerojet process using a GAC/fluidized bed under anoxic conditions and the suspended growth reactor using *W.succinogens* HAP1 developed by Tyndall A.F.B. The ability of a bioreactor to reduce low concentrations of perchlorate, approximately 1,000 micrograms per liter or less to drinking water action levels of 4-18 micrograms per liter, is an important knowledge gap. Another important knowledge gap is whether bioreactors developed for removal of nitrate (denitrification) can also be applied to removal of perchlorate.

Research Approach

Phase I

Bench-scale experiments should be conducted to evaluate several conditions pertinent to drinking water and low concentrations of perchlorate. Example factors to consider are:

1. Reactor type and configuration (fixed-film, continuous-flow).
2. Influent concentration of perchlorate (between 1,000 micrograms per liter and the action level (18 micrograms per liter).
3. Carbon source and nutrient requirements.
4. Identification of reaction mechanism and possible formation of reaction intermediates.
5. Determine reaction rates.
6. Operating conditions (ranges) (e.g., pH, temperature, residence time).
7. Influence of co-contaminants, including nitrate and VOCs such as trichloroethylene (TCE), perchloroethylene (PCE), etc.

8. Effect of influent dissolved oxygen on operating performance.
9. Characterization of the effluent concentrations of perchlorate, chloride, total organic carbon, heterotrophic plate count, pathogens and disinfectant byproduct formation potential, as well as establishing mass balances for the treatment process.
10. Identification of post treatment requirements, especially the need for filtration and disinfection.
11. Estimate costs and scale-up issues.

Phase II

Following completion of the bench-scale work, a separate pilot-scale project should be initiated approximately two years from now. The pilot-scale work should involve the most promising bench-scale system. Details of the pilot-scale work cannot be established at this time.

In general, the pilot-scale work should evaluate:

- Systems integration
- Scaling factors
- Process control capital & operating costs
- Operability

Project Advisory Committee

Project Advisory Committees (PACs) are organized by the AWWA Research Foundation (AWWARF) for each funded project to provide guidance, review all reports and significant materials, and generally monitor project performance in behalf of AWWARF and the water utility industry.

Quality Assurance

Each proposal must include a description of the procedures that will be used to ensure the quality of the data for the project. If the project involves laboratory analyses, this description should indicate whether the laboratory performing the analyses is accredited or state certified for the particular analysis. If the laboratory is not certified, and/or nonstandard methods are used, detailed quality assurance/quality control procedures must be submitted with the proposal.

Funds for this research project are provided, in part, by federal funds administered through the United States Environmental Protection Agency. Therefore, a Quality Assurance Narrative statement will be required prior to the commencement of any work on this project. The Quality Assurance Narrative statement should clearly state that the requirements of the East Valley Water District Quality Assurance requirements as well as the EPA Quality Assurance objectives and requirements will be met by the project team including any subcontractors. Additional information on these Quality Assurance requirements can be obtained by contacting the Project Manager identified below.

Budget and Time Schedule

The maximum funding available from AWWARF for this project is $550,000. A minimum 25 percent of the total project cost must be contributed by the contractor. Therefore, the total project cost is $733,000, ($550,000 in AWWARF funds and $183,000 in contractor contribution). This contribution can either be direct funding or in-kind matching of such items as personnel costs, analytical and support services, facilities, consulting services, etc. The submitting organization may elect to contribute more than 25 percent to the project but AWWARF's maximum contribution remains fixed at $550,000. Proposals that request less than $550,000 from AWWARF need only contribute 25 percent of the total project cost.

The project period should be realistic, anticipate possible starting delays, and provide ample time for the writing of final reports and for PAC review of project results. Progress reports will generally be required on a periodic basis (every four months). The final report must be completed in accordance with the AWWA Research Foundation *Format-Style Guide for Research Reports* and should include a separate chapter on recommendations to utilities. Independent of this contract, AWWARF will fund the PAC described above.

For those perchlorate-related projects that are identified as having both Phase I and Phase II activities, Phase I activities only are addressed in this Request for Proposals. The decision on Phase II activities will depend upon the success of Phase I activities, as well as the availability of Phase II funding.

Federal Funding Requirement

Funds for this research project are provided, in part, by federal funds administered through the United States Environmental Protection Agency. Therefore, AWWARF contractors will be required to follow the six affirmative steps stated in 40 CFR 33.240 or 40 CFR 31.36(e), as appropriate.

Equal Opportunity and Minority Contractors

AWWARF has a policy of non-discrimination and abides by all laws, rules, and executive orders governing equal employment opportunity. As employers, AWWARF contractors may not discriminate on the basis of age, sex, race, religion, color, national origin, handicap or veteran status. AWWARF expects its contractors to accept the goal of having a workforce that generally reflects the minority composition of the community in which it is located. It is the policy of AWWARF to encourage proposals from qualified minority owned or directed institutions.

Utility Participation

AWWARF is especially interested in proposals which include both the participation and contribution of resources from utilities in the research effort. Information on utilities that have indicated an interest in participating in this research project is available by calling the RFP desk at 303/347-6117 or 303/347-6211. However these utilities are under no obligation to participate.

Their level of participation is solely their decision. If asked to participate by several proposers, the utility may choose to work with any, all, or none of them.

Water Industry Database

AWWA and AWWARF have jointly developed a water industry database containing key utility data. To assist in the completion of their studies contractors are encouraged to obtain summary profile statistics through the AWWARF project manager.

Past Performance

Timeliness of researcher performance on past AWWARF projects will be a factor in proposal selection. Further, researchers who are late in any ongoing AWWARF sponsored studies without an approved no cost extension will not be eligible to submit proposals for the 1998 funding cycle. Researcher ineligibility includes involvement in a proposed 1998 project as a principal or co-principal investigator. If you have any questions about your eligibility for 1998 projects, please contact your current AWWARF project manager directly.

Application Procedure and Deadline

The general guidelines for preparing solicited proposals are enclosed. The guidelines contain certain provisions that the submitter should be aware of when preparing a proposal. Proposals are to be submitted to the project manager, Frank J. Blaha, Project Manager, and must be postmarked on or before **May 4, 1998.** Questions to clarify the intent of this Request for Proposal may be addressed to the project manager at 303/347-6244 or by e-mail at fblaha@awwarf.com. Eight copies of the proposal should be sent to:

Frank J. Blaha, Project Manager
AWWA Research Foundation
6666 W. Quincy Avenue
Denver, CO 80235

General information on AWWARF is described in the attached Fact Sheet.

Executive committee - meets ad hoc.

Jane Williams - USAF will call

Productive, manageable - representative of public sentiment

Tribal

- Stay away from shotgun approach

~~High priority~~

March 5 - call on 3-day agenda

(307)

Hosted by EPA, DOD, State of NV

N Shore road - 5

No more discharges in this area

672, 830, 790

Proposed meeting in Salt Lake

not just a show

Input from Jane, others - how to structure. (5-6 weeks away!)

Both science and public policy/issues

final day - technology day.

Use electronics

Public meeting - facilitator - Scientific workshop

notification of public

contact for questions.